The 12th IFToMM International Symposium on Science of Mechanisms and Machines - SYROM'2017

November 02 - 03, 2017, Iasi, Romania

CONFERENCE PROGRAM

THE 12th IFToMM International Symposium on Science of Mechanisms and Machines

SYROM'2017

November 02 – 03, 2017
IAŞI, ROMANIA



Organized by:

ROMANIAN ASSOCIATION FOR THE SCIENCE OF MECHANISMS AND MACHINES – ARoTMM

and

MECHANICAL ENGINEERING FACULTY

"GHEORGHE ASACHI" TECHNICAL UNIVERSITY OF IASI

With the support of:

INTERNATIONAL FEDERATION FOR THE PROMOTION OF MECHANISM AND MACHINE SCIENCE - IFToMM

The 12th IFToMM International Symposium on Science of Mechanisms and Machines - SYROM'2017

November 02 - 03, 2017, Iasi, Romania

CONFERENCE PROGRAM OUTLINE

Wednesday, November 01, 2017

18:00 – 20:00 Get Together (University Restaurant)

Thursday, November 02, 2017

09:00 – 10:00 Participants registration

10:00 – 10:30 Welcome, Opening Addresses

(Conference Chair, Rector, IFToMM President)

10:30 – 12:30 Plenary Session (University Conference Hall)

1. **Service Robots for Cultural Heritage Applications**
   G. CARBONE, Italy
2. **Designing Robots for Human-Robot & Robot-Robot Collaboration - Applications to Civil Engineering, Factory for the Future and Payload Transport**
   J.-C. FAUROUX, France
3. **Kinematically Redundant Octahedral Motion Platform for Virtual Reality Simulations**
   G. NAWRATIL, Austria

12:30 – 14:30 Lunch Break

14:30 – 15:45 Sections Session (for location, see detailed program)
Poster Session (Mechanical Engineering, Mechatronics and Robotics Department - IMMR, 1st floor)

15:45 – 16:15 Coffee Break

16:15 – 17:30 Sections Session

19:00 Conference Gala Dinner
(**Cosmopolitan Restaurant** at Ramada hotel)

Friday, November 03, 2017

09:00 – 09:45 Sections Session

09:45 – 10:00 Coffee Break

10:00 – 10:15 Conference Closing Ceremony (M3 Room, IMMR Department)

10:30 – 12:30 ARoTMM General Assembly (M3 Room, IMMR Department)

12:30 – 14:30 Lunch

15:00 – 17:00 Visit to “The Palace of Culture”.

Conference Chairman
Ioan DOROFTEI (Romania)
President of ARoTMM

Co-Chairmen
Doina PISLA (Romania)
Erwin-Christian LOVASZ (Romania)

International Scientific Committee
Catalin ALEXANDRU (Romania)
Paun ANTONESCU (Romania)
Virgil ATANASIU (Romania)
Ioan ARDELEAN (Romania)
Karsten BERNS (Germany)
Ion BOSTAN (Rep. of Moldova)
Tobias BRUCKMANN (Germany)
Marco CECCARELLI (Italy)
Burkhard CORVES (Germany)
Giuseppe CARBONE (Italy)
Ioan DOROFTEI (Romania)
Cezar DUCA (Romania)
Valeriu DULGHERU (Rep. of Moldova)
Jean-Christophe FAUROUX (France)
Paulo FLORES (Portugal)
Grigore GOGU (France)
Shuo HUNG CHANG (Taiwan)
Manfred HUSTY (Austria)
Zhao JUN (China)
Codruta JALIU (Romania)
Dirk LEFEBER (Belgium)
Erwin-Christian LOVASZ (Romania)
Dan MANDRU (Romania)
Vistrian MATIES (Romania)
Vasile MERTICARU (Romania)
Karl-Heinz MODLER (Germany)
Mircea NEAGOE (Romania)
Cezar OPRISAN (Romania)
Nicolae ORLANDEA (USA)
Victor PETUYA (Spain)
Doina PISLA (Romania)
Annita RAATZ (Germany)
Alexandru RUS (Romania)
Stefan STAICU (Romania)
Daniela TARNITA (Romania)
Bram VANDERBORGHT (Belgium)
Ion VISA (Romania)
Philippe WENGER (France)
Teresa ZIELINSKA (Poland)

Organizing Committee Chairman
Cezar OPRISAN (Romania)

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Emil BUDESCU (Romania)
Florentin BUIUM (Romania)
Eugen MERTICARU (Romania)

Session 1: Mechanism Design 1

Thursday, November 02, 2017

Chairmen: *Prof. Marco CECCARELLI* and *Prof. Ion VISA*

Paper no.	Title of the papers and authors	Hours	Room
041	**Solar Tracking Parallel Linkage Applicable for all Latitudes** *I. VISA, M. NEAGOE, M. MOLDOVAN, M. COMSIT*	14.30 - 14.45	**M3 IMMR Dep.**
018	**On the Design of the Gravity Balancer Using Scotch Yoke Derivative Mechanism** *H.-N. NGUYEN, W.-B. SHIEH*	14.45 - 15.00	
019	**Structural synthesis of planar 10-link 1-DOF kinematic chains with up to pentagonal links with all possible multiple joint assortments for mechanism design** *V.POZHBELKO, E.KUTS*	15.00 - 15.15	
033	**Kinematic-Dynamic Analysis of the Cam-Worm Mechanism for Humanoid Robots Shrug** *M. PENČIĆ, M. ČAVIĆ, M. RACKOV, B. BOROVAC, Z. LU*	15.15 - 15.30	
038	**Drive System of the Robot Eyeballs and Eyelids with 8 DOFs** *M. PENČIĆ, M. ČAVIĆ, M. RACKOV, B. BOROVAC, Z. LU*	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 2: Mechanism Design 2

Thursday, November 02, 2017

Chairmen: *Prof. Paun ANTONESCU* and *Prof. Cezar DUCA*

Paper no.	Title of the papers and authors	Hours	Room
059	**Forces Transmission at Structural Group 0/4/2** *C. DUCA, F. BUIUM*	16.15 - 16.30	**M3 IMMR Dep.**
048	**Topological structure of the actuating mechanisms of the urban buses doors** *D. ANTONESCU, C. BREZEANU, O. ANTONESCU*	16.30 - 16.45	
049	**Geometric synthesis of the actuating mechanisms of urban bus doors** *D. ANTONESCU, I. POPESCU, O. ANTONESCU*	16.45 - 17.00	
060	**Synthesis of the mechanisms used to actuate the cabinet doors** *D. ANTONESCU, F. GASPAR, P. ANTONESCU*	17.00 - 17.15	

Session 3: Biomechanics and Rehabilitation 1

Thursday, November 02, 2017

Chairmen: *Prof. Daniela TARNITA* and *Prof. Erwin LOVASZ*

Paper no.	Title of the papers and authors	Hours	Room
030	**Design and Finite Element Analysis of a New Spherical Prosthesis-Elbow Joint Assembly** *D. TARNITA, C. BOBORELU, D.-L. POPA, D.-N. TARNITA*	14.30 - 14.45	**M4 IMMR Dep.**
040	**Experimental Method for Dynamic Evaluation of Spinal Column Deformation Exercises** *A.-M. VUTAN, V. CIUPE, C. GRUESCU, E.-Chr. LOVASZ*	14.45 - 15.00	
042	**Kinematic design of a parallel robot for elbow and wrist rehabilitation** *B. GHERMAN, G. CARBONE, N. PLITEA, A. BANICA, M. CECCARELLI, D. PISLA*	15.00 - 15.15	
044	**Preliminary Design for a Spherical Parallel Robot for Shoulder Rehabilitation** *C. VAIDA, G. CARBONE, I. ULINICI, N. PLITEA, D. PISLA*	15.15 - 15.30	
046	**Study on the effects of rotation axis misalignment in an exoskeleton-human hip joint** *C. MOLDOVAN, I. MANIU, E.-Chr. LOVASZ, A. M. STOIAN*	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 4: Biomechanics and Rehabilitation 2

Thursday, November 02, 2017

Chairmen: *Prof. Doina PISLA* and *Prof. N. DUMITRU*

Paper no.	Title of the papers and authors	Hours	Room
009	**Children Locomotion Rehabilitation Test Bed Designed from Kinematic Considerations** *C. COPILUSI, N. DUMITRU, A. MARGINE*	16.15 - 16.30	**M4 IMMR Dep.**
017	**Design and Simulation of an Underactuated Mechanism for Leg Exoskeleton** *S. YAO, M. CECCARELLI*	16.30 - 16.45	
026	**Design, Numerical Simulation and Manufacturing of a Powered Wheelchair** *I. D. GEONEA, N. DUMITRU, A. ROSCA, A. DIDU*	16.45 - 17.00	
029	**Methodology for determining the positions of the human spine vertebrae** *S. BUTNARIU, C. ANTONYA*	17.00 - 17.15	
056	**Neurorobotic Investigation into the Control of Artificial Eye Movements** *A. MUSSINA, M. CECCARELLI, G. BALBAYEV*	17.15 - 17.30	

Session 5: Mobile Robots

Thursday, November 02, 2017

Chairmen: *Prof. Jean-Christophe FAUROUX* and *Prof. Ioan DOROFTEI*

Paper no.	Title of the papers and authors	Hours	Room
037	**Dimensional Synthesis of a Robotic Arm for Mobile Manipulator Using an Interactive Geometric Software** *S. MARAJE, J.-C. FAUROUX, B.-C. BOUZGARROU, L. ADOUANE*	14.30 - 14.45	**103 IMMR Dep.**
012	**Design and Simulation of a Snake Like Robot** *L.-M. CIUREZU-GHERGHE, N. DUMITRU, C. COPILUSI*	14.45 - 15.00	
043	**Single DoF Leg Mechanisms Analysis using GIM Software** *F. POP, C. POP, E.-Chr. LOVASZ, S. M. GRIGORESCU, I. CARABAS*	15.00 - 15.15	
055	**Design and Simulation of a Novel Hybrid Leg Mechanism for Walking Machines** *M. DEMIREL, G. CARBONE, M. CECCARELLI, G. KIPER*	15.15 - 15.30	
031	**Velocity Variation Analysis of an Autonomous Vehicle in Narrow Environment** *T. GIRBACIA, Gh. MOGAN*	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 6: Mechanism Theory

Thursday, November 02, 2017

Chairmen: *Prof. S. ZAWISLAK* and *Prof. Daniel CONDURACHE*

Paper no.	Title of the papers and authors	Hours	Room
045	**Charts of relative and absolute velocities of chosen parts of plane biplanetary gear** *J. DREWNIAK, J. KOPEĆ, J. MARSZAŁEK, K. STAŃCO, S. ZAWIŚLAK*	16.15 - 16.30	**103 IMMR Dep.**
008	**Modelling of the static response of a wind / hydro turbine with two rotors and a 1DOF speed increaser** *R. SAULESCU, M. NEAGOE, C. JALIU*	16.30 - 16.45	
034	**Higher-Order Cayley Transforms for SE(3)** *D. CONDURACHE*	16.45 - 17.00	
024	**Kinetostatic of Knife Edge Translating Follower under Dry Friction Conditions** *S. ALACI, F.-C. CIORNEI, E,-V. ALEXANDRU, C. FILOTE*	17.00 - 17.15	
025	**Tetrapod coupling** *S. ALACI, F. BUIUM, F.-C. CIORNEI, D.-I. DOBINCĂ*	17.15 - 17.30	

Session 7: Manipulators 1

Friday, November 03, 2017

Chairmen: *Prof. Giuseppe CARBONE* and *Prof. Iosif CARABAS*

Paper no.	Title of the papers and authors	Hours	Room
001	**Design and simulation of a parallel-serial LARMbot arm** *M. RUSSO, M. CECCARELLI*	09.00 - 09.15	**M3 IMMR Dep.**
039	**Kinematic Analysis of a 3-RRPS Manipulator** *S. M. GRIGORESCU, E.-Chr. LOVASZ, C. POP*	09.15 - 09.30	
063	**Dynamic Modeling and Simulation of Sliding Mode Control for a Cable Driven Parallel Robot** *F. INEL, Z. MANSOURI, M. CECCARELLI, G. CARBONE*	09.30 - 09.45	

Session 8: Manipulators 2

Friday, November 03, 2017

Chairmen: *Prof. Catalin ALEXANDRU and Prof. Silviu BUTNARIU*

Paper no.	Title of the papers and authors	Hours	Room
027	**Optimization of a spatial 2 DOF parallel mechanism used for orientation** *C.-I. BOANTA, S. BESOIU, C. BRISAN*	09.00 - 09.15	**M4 IMMR Dep.**
014	**Tensioned carbon fiber winding on a collaborative robots cell. Part 2 (tests)** *M.-P. SBANCA, Gh. MOGAN*	09.15 - 09.30	
015	**Tensioned carbon fiber winding on a collaborative robots cell. Part 1 (system)** *M.-P. SBANCA, Gh. MOGAN*	09.30 - 09.45	

Session 9: Experimental Mechanics

Friday, November 03, 2017

Chairmen: *Prof. Cezar OPRISAN* and *Prof. Stelian ALACI*

Paper no.	Title of the papers and authors	Hours	Room
013	**Use of Hypocycloidal Motion in the Study of Rolling Friction** *S. TODERAS SIRETEAN, I. MUSCA, S. ALACI, F.-C. CIORNEI*	09.00 - 09.15	**103 IMMR Dep.**
028	**Experimental Bench for Spur Gears Efficiency Measurement** *N. DUMITRU, E. DRAGUT, N. CRACIUNOIU, I.D. GEONEA*	09.15 - 09.30	
023	**Design, Development and Testing of a Dynamometer for Drill Force Measurement** *I.D. GEONEA, A. ROSCA, P. RINDERU*	09.30 - 09.45	

SYROM'2017 Poster Session

Thursday, November 02, 2017

Paper no.	Title of the papers and authors	Hours	Room
002	**Frictional contact study of the chain link / polyamide contact** *M.T. LATES, C.C. GAVRILA, R. PAPUC*	14.30 - 17.30	**IMMR Dept.** **1st floor**
003	**Design of a Class of Novel 3T1R Parallel Mechanisms with Low Coupling Degree** *H. SHEN, H. QIANG, Y. SHEN, T.-LI YANG*		
005	**Influence of number of teeth and centrifugal force on forces distribution on silent chain transmissions** *L. JURJ, R. VELICU*		
007	**Influence of chain pitch increase on bush-sprocket contact for bush chain drives** *R. VELICU, R. SAULESCU, L. JURJ*		
011	**Method for the Kinetostatic Analysis of the Road Vehicles Axle Suspensions** *C. ALEXANDRU*		
032	**Increasing the Resistance of Scuffing for HCR External Helical Gearing** *M. RACKOV, M. ČAVIĆ, M. PENČIĆ, M. VEREŠ*		
036	**Modular reconfigurable robots** *M. O. TATAR, C. I. CIREBEA*		
050	**Mechanical system for determining the shot force at football** *E. MERTICARU, L. POPESCU, E. BUDESCU*		
057	**New Concepts of Ankle Rehabilitation Devices** *C. RACU (CAZACU), I. DOROFTEI*		
058	**Some Specific Aspects of Internal Gears with Small Teeth Numbers Difference** *O. CRIVOI, I. DOROFTEI*		
061	**An IKP-DKP approach emphasizing singularities of 9R(3-RRR) mchanisms** *F. BUIUM, D. LEOHCHI, C. DUCA*		



1 – University Conference Hall; 2 – IMMR Department; 3 – University Restaurant